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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/990,964
Filing Date: November 21, 2001
Appellant(s): CHRAPLYVY ET AL.

Eamon J. Wall
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 18 May 2009 appealing from the Office action mailed 17 December 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

W. Atia et al., "Demonstration of Return-to-Zero Signaling in Both OOK and DPSK Formats to Improve Receiver Sensitivity in an Optically Preamplified Receiver", IEEE Lasers and Electro-Optics Society 12th Annual Meeting, 8-11 Nov. 1999

6,832,050 B1 Clausen et al. 12-2004

5,745,613	Fukuchi	4-1998
7,352,970 B2	Doran et al.	4-2008

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 1, 10-13, 15-16, 21, 24-25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al. (W. Atia et al., "Demonstration of Return-to-Zero Signaling in Both OOK and DPSK Formats to Improve Receiver Sensitivity in an Optically Preamplified Receiver", IEEE Lasers and Electro-Optics Society 12th Annual Meeting, 8-11 Nov. 1999) in view of Clausen et al. (U.S. Patent 6,832,050 B1) and Fukuchi (U.S. Patent 5,745,613).

Regarding claims 1 and 16, Atia teaches in FIG. 1b an apparatus adapted for use in transmission in an optical communication system, comprising a phase modulator for modulating a sequence of return-to- zero (RZ) pulses which is generated by another M-Z modulator of fig. 1b (see 4th paragraph, second sentence: "The transmitter consists of a DFB laser externally modulated by a LiNbO3 Mach-Zehnder that is sinusoidally driven to carve out RZ pulses"). Atia teaches to use DPSK format (see title). The differences between Atia et al. and the claimed invention are (a) Atia does not teaches the duty cycle of the RZ pulses, (b) Atia et al. does not teach a wavelength division multiplexer, (c) Atia et al. does not teach a dispersion managed optical transmission medium.

However, it is common and usually necessary to manage dispersion along an optical transmission medium. Clausen et al. teaches in FIG. 4 a transmission system comprising dispersion compensating devices (a) and (b). Device (a) is at the input of the transmission fiber,

i.e., pre-dispersion compensation; and device (b) is at the output of the transmission fiber, i.e., post-dispersion compensation. Clausen et al. teaches in col. 3, lines 60-62 that it is advantageous to use short pulses. In particular, Clausen et al. teaches in col. 6, lines 1-5 to use pulses of 2.5 ps for a 40 Gb/s signal, i.e., a duty cycle of 10 %. One of ordinary skill in the art would have been motivated to combine the teaching of Clausen et al. with the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre- and post dispersion compensation, as taught by Clausen et al., in the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses.

The combination of Atia and Clausen et al. still fails to teach a wavelength division multiplexer to combine an output signal of the modulator with other phase modulated signals having optical carriers with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other modulated signals having optical carriers with different wavelengths (see fig. 1). It would have been obvious to a skilled artisan at the time of invention to multiplex several modulated signal together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the modified system of Atia et al. and Clausen et al.

Regarding claims 10-11, Atia et al. teaches on page 226, 4th paragraph LiNbO3 Mach-Zehnder modulator.

Regarding claim 12, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a receiver including a delay demodulator for receiving the optical

phase modulated signal from the dispersion managed optical transmission medium (note receiver of FIG. 1(b) of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 13, the combined invention of Atia and Clausen et al. teaches that the apparatus further comprises a balanced receiver for recovering said input data from the phase modulated signal (note receiver of fig. 1 b of Atia; see also middle of 4th paragraph: "the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz balanced detector").

Regarding claim 15, the combined invention of Atia et al. and Clausen et al. teaches a discrete or distributed means of erbium-doped fiber amplification or Raman amplification (see EDFA of fig. 1b of Atia et al.).

Regarding claims 21 and 25, Clausen et al. teaches in FIG. 4 pre-dispersion compensation and post-dispersion compensation.

Regarding claim 24 and 28, Clausen et al. teaches in col. 3, lines 62-64 high dispersion fibers.

Claims 22-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al., Clausen et al. and Fukuchi as applied to claims 1, 10-13, 15-16, 21, 24-25 and 28 above, and further in view of Doran et al. (U.S. Patent 7,352,970 B2).

Atia et al., Clausen et al. and Fukuchi have been discussed above in regard to claims 1, 10-13, 15-16, 21, 24-25 and 28. The difference between Atia et al., Clausen et al. and Fukuchi and the claimed invention is that Atia et al., Clausen et al. and Fukuchi do not teach soliton

transmission. Doran et al. teaches in FIG. 5 a dispersion management system for soliton transmission. One of ordinary skill in the art would have been motivated to combine the teaching of Doran et al. with the modified apparatus of Atia et al., Clausen et al. and Fukuchi because using soliton can transmit signal over a long distance. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use soliton for transmission, as taught by Doran et al., in the modified apparatus of Atia et al., Clausen et al. and Fukuchi because using soliton can transmit signal over a long distance.

Regarding claims 23 and 27, Doran et al. teaches in FIG. 5 concatenating fibers have alternating and opposite dispersion characteristics.

(10) Response to Argument

The Appellant argues on page 13 of the Brief

"The alleged combination of Atia, Clausen and Fukuchi fails to render obvious Appellants' independent claims 1 and 16 because the references, alone or in any permissible combination fail to teach or to suggest all elements as arranged in Appellants' claims. In particular, the alleged combination of Atia, Clausen and Fukuchi fails to teach or to suggest an apparatus adapted for use in long haul transmission in an optical communication system, comprising at least one modulator, for modulating an optical phase of pulses within a sequence of return-to-zero (RZ) pulses to form an optical phase modulated signal encoded by one of phase shift keying (PSK), differential phase shift keying (DPSK) or quadrature phase shift keying (QPSK) in accordance with an input digital data stream and a wavelength division multiplexer adapted to combine an output signal of said at least one modulator with other optical phase modulated signals

having optical carriers with different wavelengths, as recited in independent claim 1, or a method of transmission for long haul optical communications, comprising modulating an optical carrier signal in a sequence of return-to-zero (RZ) pulses, modulating an optical phase of said pulses in accordance with an input digital data stream to form an optical phase modulated signal via one of phase shift keying (PSK), differential phase shift keying (DPSK) or quadrature phase shift keying (QPSK), and combining said optical phase modulated signal with other optical phase modulated signals having optical carriers with different wavelengths to form a wavelength division multiplexed signal, as recited in independent claim 16.

...

As a rationale to combine Atia and Clausen the Examiner claims that the method of Clausen: "reduces timing and amplitude jitter in transmission of RZ modulated pulses. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre- and post dispersion compensation, as taught by Clausen et al., in the transmission system of Atia because the method of Clausen et al. reduces timing and amplitude jitter in transmission of RZ modulated pulses." (See final Office Action p. 3). As a rationale to combine Fukuchi and Atia, the Examiner asserts that "a wavelength division multiplexer" is a structure "well known in the art," and that: "It would have been obvious to a skilled artisan at the time of the invention to multiplex several modulated signals together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the modified system of Atia et al. and Clausen et al." (See final Office Action p. 3). Appellants respectfully disagree that the combination of

references as alleged by the Examiner renders Appellants' independent claims 1 and 16 obvious. As set forth below, Appellants respectfully submit that the evidence of non-obviousness vastly outweighs any evidence suggesting to the contrary."

The Examiner disagrees. First, there is no such thing as "evidence of non-obviousness" in 35 U.S.C. 103(a). If a claimed invention is non-obvious to one person, but is obvious to another person, the claimed is not patentable. In wording similar to that of the Appellant, the statue dictates that "evidence of obviousness always overrule evidence of non-obviousness". If the Examiner and, sometimes, other parties fail to provide evidence of obviousness, the claimed invention is patentable without requiring the applicant to provide any "evidence of non-obviousness".

The Appellant argues on page 15 of the Brief

"Appellants respectfully submit that the Examiner's analysis, using Atia as the starting point and suggesting modifications in accordance with Clausen and Fukuchi is only reasonable when based upon hindsight. MPEP 2142.02 states that "[i]n determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." (citing Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983)).

The Examiner fails to consider the embodiments of Appellants' claims 1 and 16 as a whole and instead narrowly focuses on the differences between Atia, the primary reference, and Appellants' claims. For example, at page 2 of the final Office Action it is noted by the Examiner that "the differences between Atia et al. and the claimed invention

are (a) Atia does not teach the duty cycle of the RZ pulses, (b) Atia et al. does not teach a wavelength division multiplexer, (c) Atia et al. does not teach a dispersion managed optical transmission medium." (See Office Action p. 2). With regard to the feature of a wavelength division multiplexer the Examiner asserts that "this structure is well known in the art" and "Fukuchi teaches a WDM to combine the output signal of the modulator with other modulated signals..." (See Office Action p. 3). However, the proper inquiry is not whether a wavelength division multiplexer is obvious or well known, but whether the claimed invention as a whole would have been obvious. Limiting the inquiry to such structural differences with the prior art fails to consider Appellants' claims in the proper regard, i.e., as a whole."

The Examiner disagrees. The Examiner clearly suggests in the rejection that it is obvious to combine the references to come up with the claimed invention. The rejection is based on 35 U.S.C. 103(a) which is reproduced below one more time.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The statue clearly suggests that in a patentability investigation, the differences between the subject matter sought to be patented and the prior art should be considered. The Examiner states that WDM is well known. The Examiner does not state that WDM is obvious. The Examiner

does not make the conclusion of obvious based solely on the fact that WDM is well known. Instead, the Examiner cites Fukuchi to resolve the question of skills of ordinary artisan. The question the Examiner asks himself was whether an engineer of ordinary skill in the art, knowing the RZ-DPSK format of transmission over optical fiber, would have seen a benefit of using the same format in a WDM system. Since a WDM system is simply a sharing of a single fiber by a plurality of wavelength channels where each channel is somewhat independent of the other channels, the answer is affirmative. Yes, there are issues such as crosstalk and non-linearity that need to be addressed. However, these are performance issues, such as how many channels can be multiplexed together, the wavelength distance between adjacent channels, how far a distance the optical signal can be transmitted without serious degradation, the data rate, the bit-error rate, etc. Nevertheless, it is obvious to try. The Examiner reaches the conclusion of obvious only after the Examiner convinces himself that one of ordinary skill in the art would have combine the references together to arrive at the method or apparatus of the claimed invention. That is, the obviousness conclusion is made by taking the claimed invention as a whole into consideration.

The Appellant argues on page 16 of the Brief

"For instance, Appellants' goal was not simply to expand the use of return-to-zero phase shift keying (RZ-PSK) or RZ-DPSK from a single channel implementation to a WDM system. Rather, Appellants' sought to develop an improved multi-channel high bit rate (e.g., 40 Gbit/s) long-haul/ultra long-haul optical transmission system and were not confined to considering only RZ-PSK data encoding schemes. (See, Specification p. 1-2, Background of the Invention). Prior to Appellants' innovation, efforts were hampered by intra-channel non-linear penalties, such as intra-channel cross phase modulation (XPM)

among adjacent overlapping bits that mostly leads to timing jitter, as well as by intra-channel four wave mixing (FWM), that mostly leads to amplitude fluctuations. Use of high bit rates in conjunction with long haul and ultra-long haul (ULH) transmission, particularly in the environment in which multiple channels are combined in a WDM or dense WDM (DWDM) system, was additionally difficult, due to both worsened nonlinear impairments and increased amplifier spontaneous emission (ASE) noise, which leads to degradation of pulses as they propagate through an optical fiber path from a transmitter to a receiver. (See, e.g., Specification p. 1, 3rd paragraph).

Appellants overcome these deficiencies in prior long-haul high-bit rate WDM systems through the novel use of RZ (as opposed to non-return-to-zero (NRZ)) and PSK (in contrast to intensity modulation, such as on-off keying (OOK)). Advantageously, by virtue of the use of RZ-PSK formats, the XPM penalty is mostly eliminated by removing the intensity-pattern dependence. Compared with OOK, differential phase shift keying (DPSK) for example is more tolerant to ASE noise because of its higher receiver sensitivity, especially when a balanced receiver is used, and allows for transmission with lower optical power. This also reduces the FWM penalty, for example, a 3dB reduction in power leads to 6dB reduction in the FWM effects. (See Specification p. 2-3, Summary of the Invention 5th paragraph).

The Examiner's analysis overlooks Appellants' innovation by merely combining allegedly known components in hindsight without due regard to the abovementioned challenges which Appellants faced and overcame. Appellants respectfully submit that claims 1 and

16 are non-obvious when considering the numerous advantages which the cited references completely fail to disclose."

In response to Appellant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., high bit rate, e.g., 40 GHz, long-haul/ultra long-haul) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the claimed invention fails to include any additional limitations to make these advantages happen. If all these advantages are a direct consequence of using RZ-PSK or RZ-DPSK in a WDM system, the claimed invention is obvious in view of the combination of the references because the combination of the references teaches the same method or apparatus as the claimed invention and, therefore, must also process the same advantages.

The Appellant argues on page 17 of the Brief

"The Examiner asserts that "it would have been obvious to a skilled artisan at the time of the invention to multiplex several modulated signals together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the modified system of Atia et al. and Clausen et al." (See final Office Action p. 3). However, this assertion casually ignores the fact that Appellants' could not simply choose to implement RZ-PSK or RZ-DPSK and immediately assume that such a multi- channel optical transmission system would be superior to other transmission formats, such as on-off keying (OOK) in a long-haul or ultra long-haul operation."

The Examiner disagrees. Multiplexing is a mature technique. There exist various multiplexing schemes such as time-division multiplexing (TDM), frequency-division multiplexing (FDM) and wavelength-division multiplexing (WDM). WDM is a special kind of FDM; the term WDM is used when the frequency-division multiplexing is done in optical frequency range. The simultaneous broadcasting of AM radio, FM radio and TV channels is an example of FDM. It is well understood that many channels can share the same medium as long as their spectrum do not overlap. Therefore, there is a reasonable expectation of success to transmit many wavelength channels using NRZ-DPSK, RZ-DPSK, NRZ-OOK or RZ-OOK in a WDM system.

The obviousness conclusion is not based on the assumption that RZ-DPSK is superior to RZ-OOK. The obvious conclusion is based on the likelihood and easiness that one of ordinary skill in the art would have combined the teachings of the references to come up with the claimed invention.

The Appellant argues on page 17 of the Brief

"Appellants teach in the Specification there is no predictability of success when transitioning from an optical single channel application to an optical WDM system. For example:

...

(See, Specification p. 1-2, Background of the Invention, emphasis added). Thus, success in a single channel application is no predictor of whether a similar WDM system will also be successful. The converse is also true. For example, inter-channel cross-phase modulation (XPM) is the leading non-linear impairment in a dense wavelength division

multiplexed (WDM) system while it does not exist in a single channel system. Notably, phase shift keying underperforms amplitude shift keying in a single channel system while having advantages in a WDM system due to its relative immunity to XPM. (See Provision Application Serial No. 60/299,858, filed on June 21, 2001, p. 3-4)."

In response, the Examiner notes that the remark on pp. 1-2 of the specification which is quoted by Appellant is understandable. The quoted paragraph talks about performance. Therefore, it uses phrases such as "degrees of success", "do not work well". In other words, a system of WDM with various modulation schemes can definitely be built. However, different scheme gives different performance. Since Atia et al. does not teach away from using RZ-DPSK in a WDM system and Fukuchi does not teach away from using RZ-DPSK in a WDM system, there is no reason to prohibit one or ordinary skill in the art from trying RZ-DPSK modulation in a WDM system.

The Appellant argues on page 18 of the Brief

"In the final Office Action, the Examiner fails to establish any express motivation to combine as taught by the references themselves. Specifically, there is no suggestion or motivation found in the prior art (Atia, Clausen, or Fukuchi) that would suggest to one of ordinary skill to combine the references in such a way so as to create the apparatus as embodied in claim 1 or practice the method embodied in claim 16.

Atia teaches that the use of both on-off keying (OOK) (an intensity modulation format) and differential phase shift keying (DPSK) with return-to-zero (RZ) pulses are both advantageous in improving the sensitivity of a receiver. (See Atia p. 226, last paragraph).

Clausen teaches a single channel system using intensity modulated signals (e.g., OOK)

(see Clausen col. 1 lines 51-54) which is completely contrary to Appellants' teachings and the invention as embodied in claims 1 and 16 where a sequence of return-to-zero (RZ) pulses are phase modulated. Thus, if anything, Clausen would suggest to one of skill in the art only to modify the OOK embodiment of Atia."

The Examiner disagrees. The Appellant's interpretation of Clausen as completely contrary to Appellant's teaching and the invention as embodied in claim 1 and claim 16 is incorrect. Such narrow interpretation of prior art reference has been warned by the Supreme Court. See KSR International Co. v. Teleflex Inc., 127 S. Ct. 1727, 82 USPQ2d 1385 (U.S. 2007), "[One] errs to limit the prior art references to only those that addresses the precise problem that the patentee was trying to solve." Also amplitude modulation is not **completely** contrary to RZ-DPSK. The fact is: Atia teaches in FIG. 1(a) RZ-OOK and in FIG. 1(b) RZ-DPSK; in both embodiments, the clock pulses are used to carve out optical RZ pulses by amplitude modulating the laser beam from the DFB laser. That is, the pulses are generated by amplitude modulation, the same modulation scheme as taught by Clausen, and then modulated by phase modulation in the case of RZ-DPSK. The duty cycle is determined by the amplitude modulation, not the phase modulation.

The Appellant argues on page 19 of the Brief

"In addition, Fukuchi discloses WDM with non-return-to-zero (NRZ) intensity modulated signals. (See Fukuchi, Abstract and col. 1 lines 21-23). Again, this is completely contrary to Appellants' claims 1 and 16 and the teachings of the Specification. Thus Appellants submit that Fukuchi teaches the opposite of the invention as embodied in claims 1 and 16 and would not suggest to one of ordinary skill to combine the WDM system of Fukuchi

with Aria and Clausen to arrive at Appellants' independent claims 1 and 16. See generally MPEP 2143 and MPEP 2143.02."

The Examiner disagrees. Again, the Appellant errs in narrowly interpreting prior art. Fukuchi gives in the background section an example of a coding scheme. Fukuchi does not teach away from using other coding schemes. Considering all the references together, one of ordinary skill in the art would have tried or used RZ-DPSK in a WDM system due to the better performance of RZ code over NRZ code as taught by Atia.

The Appellant argues on page 19 of the Brief

"As stated above, Atia and Clausen are single wavelength channel applications and do not discuss or suggest WDM. Aria teaches that the use of both on-off keying (OOK) (an intensity modulation format) and differential phase shift keying (DPSK) with return- to-zero (RZ) pulses are both advantageous in improving the sensitivity of a receiver. (See Atia p. 226, last paragraph). Clausen teaches intensity modulated signals (e.g., OOK) (see Clausen col. 1 lines 51-54) which is completely contrary to Appellants' teachings and the invention as embodied in claims 1 and 16 where a sequence of return- to-zero (RZ) pulses are phase modulated. Moreover, Fukuchi teaches non-return to zero (NRZ) intensity modulated signals (see Fukuchi, Abstract and col. 1 lines 21-23), which also is completely contrary to Appellants' teachings and the embodiments of claims 1 and 16. On the other hand, Appellants teach that by virtue of the use of DPSK (or other PSK formats), the XPM penalty is mostly eliminated by removing the intensity-pattern dependence. Compared with OOK, DPSK is more tolerant to ASE noise because of its higher receiver sensitivity, especially when a balanced receiver is used, and allows for

transmission with lower optical power. This also reduces the FWM penalty..." (See, e.g., Specification p. 2-3). Thus, Appellants determined that RZ-DPSK had clear advantages over RZ-OOK in a long-haul multi-channel optical transmission system. Atia, as well as the other two references, completely fail to disclose the same and in fact teach the opposite.

Appellants respectfully submit that one of ordinary skill viewing all of the cited references in the proper context, if anything, would be lead to use RZ-OOK because Atia shows no preference for DPSK over OOK and both Clausen and Fukuchi are solely intensity modulated systems. Thus, Appellants respectfully submit that the use of RZ- PSK in a long-haul WDM system as recited claims 1 and 16 is not obvious over Atia in view of Clausen and Fukuchi."

The Examiner disagrees. An appropriate response to the Appellant's argument is a quote from KSR International Co. v. Teleflex Inc., 127 S. Ct. 1727, 82 USPQ2d 1385 (U.S. 2007) "A person of ordinary skill often will be able to fit the teachings of multiple patents together like piece of a puzzle." The Examiner recognizes that an engineer, who learns by reading patents and papers, operates in a mode quite different from a student who learns by reading textbooks. The three references cited by the Examiners were written by three different groups of authors. Each of them does not coordinate with, or even aware of, the others. An engineer learns how to pick from the publications what they are looking for and tries various combinations. An engineer, after reading Atia, is unlikely to draw a conclusion and pick only one modulation technique to try. Instead, it is very likely that they would try NRZ-OOK, NRZ-DPSK, RZ-OOK and RZ-DPSK.

In making a rejection based on the three references, the Examiner is not suggesting that one of ordinary skill in the art, after reading the three references and without knowing the claimed invention, would have chosen to build a system as claimed in claim 1 or 16. Instead, the Examiner is analyzing the difference between Atia and the claimed invention and forming an opinion as whether the claimed invention as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. This has been done by first resolving the knowledge of ordinary skill in the art based on the teaching of using short pulses by Clausen and the teaching of WDM technique by Fukuchi; and then by answering the question "would one of ordinary skill in the art modify the system of Atia by using short pulses and by combining many transmission channels with different wavelengths in a WDM system. The affirmative answer to this question has led the Examiner to draw the conclusion that the claimed invention is obvious and not patentable in view of the references.

The Appellant argues on page 20 of the Brief

"As further evidence of non-obviousness, Appellants note that the invention as embodied in claims 1 and 16 is contrary to the known teachings at the time of the invention. For example, as explained in Appellants' Specification:

...

(See Specification p. 9 (emphasis added); cited articles were disclosed in an IDS and are available in PAIR). In view of such teachings, Appellants submit that one of ordinary skill would have been discouraged from creating the embodiments of Appellants' independent claims 1 and 16. Rather, such a person would have preferred OOK for transmission distances greater than 1000km (i.e., long-haul).

Moreover, the teachings of Atia, Clausen and Fukuchi contain nothing that would alter this conclusion when viewed by one of ordinary skill in the art at the time of the invention. Indeed, as discussed above the combination of references Atia, Clausen and Fukuchi would also lead to an OOK intensity modulation scheme, if anything. Thus, for at least the foregoing reasons Appellants respectfully submit that claims 1 and 16 are non-obvious over Atia in view of Clausen and Fukuchi."

The Examiner disagrees. First, the Appellant selectively cites certain references as evidence of non-obviousness. However, there are also references that teach using RZ format in WDM. For examples:

Robinson et al. (U.S. Patent 6,643,429 B2) teaches in col. 14, line 20-24 and col. 15, lines 38-39 using RZ format in WDM systems.

Lu et al. (U.S. Patent 6,832,051 B2) teaches in col. 1, lines 12-15 RZ-WDM system.

Bai (U.S. Patent 6,856,770 B2) teaches in col. 2, lines 1-17 the advantages of using RZ over NRZ in a WDM system.

The Examiner notes that these publications are not available at the time instant application was filed. However, the Applicant's ignorance of these references cannot be accepted as an evidence for proving that using RZ-DPSK is not obvious.

Second, if the inventor, knowing the superior of OOK over DPSK, can use RZ-DPSK in a WDM system, there is no reason to assume that all other people, knowing the superior of OOK over DPSK, would not use RZ-DPSK in a WDM system. The fact that the inventor, knowing the superior of OOK over DPSK, still uses or tries to use RZ-DPSK in a WDM system is not a prove

that all other people, knowing or not knowing the superior of OOK over DPSK, would not use or try to use RZ-DPSK in a WDM system.

Third, claim 1 and claim 16 do not recite any limitation to limit the scope of the claims to transmission systems with transmission distance of greater than 1000 km. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). As admitted by the Appellant, the combination of Atia, Clausen and Fukuchi renders the using of RZ-DPSK in a WDM system obvious at least for transmission system with a transmission distance of less than 1000 km.

The Appellant argues on page 21 of the Brief

"In further support of the non-obviousness of Appellants' claims, Appellants respectfully refer to a Declaration under 37 C.F.R. 132, executed by the inventors on September 13, 2007 and submitted September 17, 2007, to show the contrast in the number of reported activities of RZ-DPSK in fiber transmission, before and after the report of experimental results of the present invention at the 2002 Optical Fiber Conference (OFC 2002, FC2, p. 2 Exhibit A), one of the most well-attended conferences in optical communications technology.

As shown in the Declaration and associated Exhibits, there was no report of RZ- DPSK in fiber transmission link in the post-deadline session of OFC 2001, i.e., prior to Appellants' FC2 paper in 2002.

However, in 2003, the year after Appellants' report, 50% of the post-deadline papers (five out of a total of ten) in the Optical Fiber Transmission session at OFC 2003 relate

to RZ-DPSK in fiber transmission. Specifically, the original FC2 paper submitted by Lucent Technologies, Inc. in 2002 was directly referenced in four of these post- deadline papers on RZ-DPSK (and indirectly referenced in the fifth paper). The fact that Appellants' method was widely adopted, referred to, and followed by Appellants' peers after the 2002 report provides convincing evidence of the non-obvious nature of the method."

Without fully understanding the whole picture of the academic and industrial environment around years 2001~2003, the Examiner is not in a position to explain or comment on the statistics presented by the Appellant. However, the Examiner is not convinced by the statistics that there is no reason to combine the references, or the claimed invention is not obvious in view of the combination.

The Appellant argues on page 22 of the Brief

"In the final Office Action, the Examiner dismisses portions of Appellants' prior responses as mere statement or argument by the Appellants' attorney. (See final Office Action p. 6). Appellants respectfully submit that such treatment by the Examiner is erroneous because Appellants' arguments were not the words of counsel, but were based upon quotations direct from the Appellants' Specification, which is sworn to by the Inventors/Appellants, or referred directly to peer publications. Thus, to the extent that the Final Office action discounts Appellants' previous arguments, Appellants submit that the rejection over Atia, Clausen and Fukuchi under 35 U.S.C. §103 is improper. See MPEP 716.01(a): "Examiners must consider comparative data in the specification which is intended to illustrate the claimed invention in reaching a conclusion with regard to the

obviousness of the claims." (citing, In re Margolis, 785 F.2d 1029, 228 USPQ 940 (Fed. Cir. 1986)).”

The Examiner disagrees. As explained above, the Appellant's ignorance of references that teach RZ-WDM transmission cannot be accepted as an evidence for proving that the combination of the Atia et al., Clausen et al. and Fukuchi fails to teach the claimed invention and renders the claimed invention obvious.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/S. K. L./
Primary Examiner, Art Unit 2613

Conferees:

/Kenneth N Vanderpuye/

Supervisory Patent Examiner, Art Unit 2613

/M. R. Sedighian/

Primary Examiner, Art Unit 2613